

of thunderstorms for the whole country were most numerous were: 9th, 249; 10th, 294; 11th, 282; 18th, 243; 23d, 254. They were least numerous on the 12th, 81; 29th, 80.

Reports were most numerous in: Illinois, 245; New York, 240; Ohio, 439; Pennsylvania, 299.

Thunderstorm days were most numerous in: Colorado, 28; Florida, 30; New York, 29; Ohio, 31; Tennessee, 27.

In Canada.—Thunderstorms were reported on the following dates: Halifax, 24; Grand Manan, 9, 30; Yarmouth, 24, 30; Chatham, 5, 6; Father Point, 10, 23; Quebec, 2, 7, 11, 15, 16, 21, 22, 23; Montreal, 1, 5, 11, 14, 16, 20, 23; Rockliffe, 5, 14, 19, 21, 23; Toronto, 11, 18, 22, 23, 30; White River, 9, 17, 26, 27, 30; Port Stanley, 11, 13, 14, 18, 25, 26, 30, 31; Saugeen, 18; Parry Sound, 11, 14, 20, 22; Port Arthur, 3, 4, 8, 9; Winnipeg, 2, 4, 5, 8, 18, 28, 29; Minnedosa, 5, 13, 17, 25; Qu'Appelle, 1, 3, 6; Medicine Hat, 10, 25; Swift Current, 5, 6, 8, 10, 21, 24; Calgary, 9; Prince Albert, 4, 30; Edmonton, 1, 17, 24, 30; Battleford, 6, 7, 21.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, from the 9th to the 17th, inclusive. On the remaining twenty-two days of this month 123 reports were received, or an average of about 6 per day. The dates on which the number of reports of auroras for the whole country especially exceeded this average were: 21st, 51; 30th, 39.

Reports were most numerous in: Iowa, 11; Michigan, 22; Ohio, 17; Wisconsin, 19.

The number of reports was a large percentage of the number of observers in: Michigan, 20; Ohio, 13; South Carolina, 14; Wisconsin, 31.

In Canada.—Auroras were reported on the following dates: Halifax, 21; Charlottetown, 21; Father Point, 21, 26, 28, 29; Quebec, 21; Montreal, 21, 30; White River, 22; Saugeen, 20; Winnipeg, 6; Minnedosa, 29, 30; Medicine Hat, 18; Swift Current, 31; Prince Albert, 20, 21, 30.

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Snowfall and rainfall are expressed in inches.

Alabama.—The mean temperature was 81.1°, or 0.6° above normal; the highest was 105°, at Decatur on the 3d, and the lowest, 50°, at Maple Grove on the 12th and 13th, and at Newburg on the 14th. The average precipitation was 4.78, or 0.38 below normal; the greatest monthly amount, 10.49, occurred at Newton, and the least, 0.56, at Clanton.—*F. P. Chaffee.*

Arizona.—The mean temperature was 82.4°, or 2.4° above normal; the highest was 118°, at Texas Hill; the lowest was 38°, at Fort Defiance on the 19th. The average precipitation was 1.62, or 0.42 above normal; the greatest monthly amount, 9.65, occurred at Benson, while none fell at Casa Grande.—*W. T. Blythe.*

Arkansas.—The mean temperature was 82.5°, or 2.3° above normal; the highest was 109°, at Keesees Ferry on the 30th and 31st, and the lowest, 50°, at Keesees Ferry on the 14th, and at Silver Springs on the 13th and 14th. The average precipitation was 3.25, or 0.66 below normal; the greatest monthly amount, 8.19, occurred at Moore, and the least, 0.65, at Washington.—*F. H. Clarke.*

California.—The mean temperature is obtained by dividing the State into equal areas, finding the mean of each square, and then dividing by the number of squares. The mean temperature was 74.5°, or 1.4° above normal; the highest was 124°, at Salton on the 22d. At Volcano Springs a temperature of 123° occurred on the 9th, while 120° occurred at Palm Springs, 118° at Ogilby, and 115° at Indio and Mammoth Tank; the lowest was 21°, at Bodie on the 6th and 22d, and at Nevada City on the 7th. The average precipitation was 0.01, or 0.04 below normal; the greatest monthly amount, 0.62, occurred at Descanso; at most places no rain fell.—*W. H. Hammon.*

Colorado.—The mean temperature was 65.5°, or 1.8° below normal; the highest was 109°, at Lamar on the 8th, and the lowest, 21°, at Walden, in North Park, on the 20th. Freezing temperatures occurred at a number of stations of moderate elevation on the 20th. The average precipitation was 2.05, or 0.15 below normal; the greatest monthly amount, 4.65, occurred at Minneapolis, and the least, 0.12, at Vilas. Snow fell at mountain stations on the 3d and 19th, the greatest amount reported being 10 inches at Ruby.—*F. H. Brandenburg.*

Florida.—The mean temperature was 82.1°, or slightly above normal; the highest was 102°, at Macclenny on the 1st and 2d, and the lowest, 60°, at Gainesville on the 15th. The average precipitation was 6.90, or 1.67 above normal; the greatest monthly amount, 14.82, occurred at Meyers, and the least, 2.19, at Pensacola.—*A. J. Mitchell.*

Georgia.—The mean temperature was 80.6°, or 0.2° below normal; the highest was 107°, at Leverett on the 3d, and the lowest, 46°, at Diamond on the 14th. The average precipitation was 5.74, or 0.58 above normal; the greatest monthly amount, 14.43, occurred at Gainesville, and the least, 1.15, at Cordele.—*J. B. Marbury.*

Idaho.—The mean temperature was 64.0°; the highest was 108°, at Minidoka on the 25th, and the lowest, 27°, at Lake on the 17th and at Martin and Swan Valley on the 19th. The average precipitation was

0.75; the greatest monthly amount, 2.43, occurred at Murray, and the least, trace, at Burnside and Martin.—*D. P. McCallum.*

Illinois.—The mean temperature was 77.0°, or 1.2° above normal; the highest was 106°, at Atwood on the 9th, and the lowest, 48°, at Scales Mound and Zion on the 13th. The average precipitation was 3.45, or 0.44 above normal; the greatest monthly amount, 7.85, occurred at Coatsburg, and the least, 0.93, at Jordans Grove.—*C. E. Linney.*

Indiana.—The mean temperature was 76.9°, or 2.1° above normal; the highest was 104°, at Kokomo on the 8th, and the lowest, 44°, at Hammond on the 13th. The average precipitation was 3.36, or 0.23 above normal; the greatest monthly amount, 9.09, occurred at Evansville, and the least, 0.74, at Hammond.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 75.6°, or 1.6° above normal; the highest was 106°, at Malvern on the 23d, and the lowest, 42°, at Rockwell City on the 12th. The average precipitation was 3.26, or about 1.00 below normal; the greatest monthly amount, 7.60, occurred at Stuart, and the least, 1.01, at Osceola.—*G. M. Chappel.*

Kansas.—The mean temperature was 80.2°, or 1.9° above normal; the highest was 111°, at Wallace on the 6th, and the lowest, 45°, at Goodland on the 19th. The average precipitation was 3.13, or 0.60 below normal; the greatest monthly amount, 7.13, occurred at McPherson, and the least, 0.05, at Pratt.—*T. B. Jennings.*

Kentucky.—The mean temperature was 77.8°, or 1.5° above normal; the highest was 107°, at Pilot Oak on the 31st, and the lowest, 50°, at Eubank on the 14th. The average precipitation was 4.79, or 0.41 above normal; the greatest monthly amount, 9.05, occurred at Alpha, and the least, 0.82, at Ensor.—*Frank Burke.*

Louisiana.—The mean temperature was 83.1°, or 1.4° above normal; the highest was 104°, at Liberty Hill on the 6th, 25th, 26th, and 27th, and at Montgomery on the 26th; the lowest was 56°, at Oak Ridge on the 14th. The average precipitation was 3.83, or 1.79 below normal; the greatest monthly amount, 8.09, occurred at Amite, and the least, 0.44, at Robeline.—*R. E. Kerkam.*

Maryland and Delaware.—The mean temperature was 75.6°, or 0.5° above normal; the highest was 102°, at Westernport on the 3d, and the lowest, 41°, at Deer Park on the 14th. The average precipitation was 6.94, or 3.17 above normal; the greatest monthly amount, 19.90, occurred at Jewell, and the least, 2.78, at Cherryfields.—*F. J. Walz.*

Michigan.—The mean temperature was 72.1°, or 2.8° above normal; the highest was 104°, at Clinton on the 9th, and the lowest, 22°, at Humboldt on the 14th. The average precipitation was 3.23, or 1.00 above normal; the greatest monthly amount, 10.10, occurred at Bay City, and the least, 0.16, at Benton Harbor.—*O. F. Schneider.*

Minnesota.—The mean temperature was 71.5°, or 1.1° above normal; the highest was 102°, at Lawrence on the 18th, and the lowest, 38°, at Tower on the 28th. The average precipitation was 6.62, or 2.97 above normal; the greatest monthly amount, 12.81, occurred at Milaca and St. Cloud, and the least, 2.79, at Caledonia.—*T. S. Outram.*

Mississippi.—The mean temperature was 82.8°, or 1.5° above normal; the highest was 109°, at Columbus on the 3d and 4th, and the lowest, 52°, at Aberdeen on the 14th. The average precipitation was 4.42, or 0.58 above normal; the greatest monthly amount, 9.78, occurred at Leakesville, and the least, 0.95, at Hernando.—*R. J. Hyatt.*

Missouri.—The mean temperature was 78.8°, or 1.7° above normal; the highest was 106°, at New Madrid and Princeton on the 31st, and the lowest, 48°, at Ironton and Potosi on the 14th. The average pre-

precipitation was 3.40, or 0.51 below normal; the greatest monthly amount, 9.97, occurred at McCune Station, and the least, 0.60, at Emma.—*A. E. Hackett.*

Montana.—The mean temperature was 64.0°, or 4.0° below normal; the highest was 103°, at Fort Keogh on the 27th, and the lowest, 32°, at Castle on the 9th and at Kipp on the 18th. The average precipitation was 1.64, or 0.17 below normal; the greatest monthly amount, 3.24, occurred at Great Falls, and the least, 0.19, at Fort Keogh.—*R. M. Crawford.*

Nebraska.—The mean temperature was 75.9°, or 0.6° above normal; the highest was 112°, at Franklin on the 23d, and the lowest, 34°, at Camp Clark on the 10th. The average precipitation was 2.57, or 0.92 below normal; the greatest monthly amount, 7.44, occurred at Chester, and the least, 0.35, at Whitman.—*G. A. Loveland.*

Nevada.—The mean temperature was 69.4°, or 3.0° below normal; the highest was 116°, at St. Thomas on the 11th, 12th, and 27th; the lowest was 25°, at Hamilton on the 2d. The average precipitation was 0.27, or 0.01 above normal; the greatest monthly amount, 1.41, occurred at Palmetto, while no rain fell at several stations.—*R. F. Young.*

New England.—The mean temperature was 70.6°, or 1.1° above normal; the highest was 102°, at Plymouth, N. H., on the 5th, and the lowest, 40°, at Bar Harbor, Me., on the 19th, at West Milan, N. H., on the 27th, and at Flagstaff, Me., on the 28th. The history of the regular and voluntary observation service in New England furnishes no parallel to the precipitation record of this July. The extremes in the total falls of the month were 2.62 inches at Portland, Me., and 19.90 inches at Southington, Conn., a most remarkable variance considering the comparatively small area of this district.—*J. W. Smith.*

New Jersey.—The mean temperature was 74.1°, or 0.5° below normal; the highest was 100°, at Boonton, Dover, and Riverdale on the 10th, and the lowest, 50°, at Charlotteburg on the 16th. The average precipitation was 11.42, or 7.14 above normal; the greatest monthly amount, 20.80, occurred at Elizabeth, and the least, 6.11, at Camden.—*E. W. McGann.*

New Mexico.—The mean temperature was about 2.5° below normal; the highest was 104°, at Eddy on the 14th, and the lowest, 24°, at Winsors Ranch on the 20th. The greatest monthly precipitation, 5.60, occurred at Lower Penasco, and the least, 0.10, at Raton.—*H. B. Hersey.*

New York.—The mean temperature was 72.5°, or 2.5° above normal; the highest was 102°, at Avon on the 5th and 10th, and the lowest, 43°, at South Kortright on the 9th. The average precipitation was 6.69, or 3.02 above normal; the greatest monthly amount, 18.18, occurred at Setauket, and the least, 2.20, at Mount Morris.—*R. M. Hardinge.*

North Carolina.—The mean temperature was 77.2°, or 0.4° below normal; the highest was 103°, at Saxon on the 3d, and the lowest, 45°, at Highlands and Linville on the 15th. The average precipitation was 5.60, or normal; the greatest monthly amount, 11.11, occurred at Fayetteville, and the least, 2.07, at Sloan.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 68.9°, or 0.2° above normal; the highest was 109°, at Medora on the 28th, and the lowest, 38°, at Bordulac on the 4th. The average precipitation was 4.43, or 2.06 above normal; the greatest monthly amount, 8.94, occurred at Amenias, and the least, 0.33, at Glen Ullin.—*B. H. Bronson.*

Ohio.—The mean temperature was 75.5°, or 2.4° above normal; the highest was 113°, at Thurman on the 4th, and the lowest, 44°, at Levering on the 14th and 15th. The average precipitation was 4.65, or 1.09 above normal; the greatest monthly amount, 10.69, occurred at Ashtabula, and the least, 0.82, at Hedges.—*H. W. Richardson.*

Oklahoma.—The mean temperature was 82.4°; the highest was 110°, at Kingfisher and Winnview on the 14th, and the lowest, 48°, at Burnett on the 13th. The average precipitation was 2.05; the greatest monthly amount, 5.12, occurred at Beaver, and the least, 0.48, at Woodward.—*J. I. Widmeyer.*

Oregon.—The mean temperature was 63.7°, or 0.9° below normal; the highest was 107°, at Pendleton on the 11th, and the lowest, 28°, at Silver Lake on the 17th. The average precipitation was 0.58, or 0.12 above normal; the greatest monthly amount, 3.69, occurred at Bay City, while no rain fell at several stations.—*B. S. Pague.*

Pennsylvania.—The mean temperature was 73.4°, or 2.4° above normal; the highest was 103°, at Aqueduct on the 6th, and at Derry Station on the 5th and 6th, and the lowest, 41°, at Lock Haven on the 29th. The average precipitation was 6.26, or 2.11 above normal; the greatest monthly amounts were 14.51 at Saegerstown, 13.10 at Swiftwater, 12.42

at Forks of Neshaminy, 11.45 at Shawmont, 10.94 at Elwood Junction, and 10.25 at Philadelphia, Centennial Avenue; the least, 2.10, occurred at Cannonsburg.—*T. F. Townsend.*

South Carolina.—The mean temperature was 80.2°, or 0.4° above normal; the highest was 107°, at Batesburg on the 3d, and the lowest, 54°, at Walhalla on the 15th. The average precipitation was 5.91, or 0.11 below normal; the greatest monthly amount, 9.81, occurred at St. Stephens, and the least, 2.99, at Spartansburg.—*J. W. Bauer.*

South Dakota.—The mean temperature was 72.8°, or about normal; the highest was 107°, at Ashcroft on the 28th, and the lowest, 35°, at Ashcroft on the 20th. The average precipitation was 3.26, or 0.65 above normal; the greatest monthly amount, 7.27, occurred at Castlewood, and the least, 0.46, at Spearfish.—*S. W. Glenn.*

Tennessee.—The mean temperature was 77.7°, or 1.0° above normal; the highest was 105°, at Savannah on the 2d and at St. Joseph on the 2d and 3d, and the lowest, 46°, at Erasmus on the 14th. The average precipitation was 5.09, or 0.46 above normal; the greatest monthly amount, 13.21, occurred at Oak Hill, and the least, 0.40, at Brownsville.—*H. C. Bate.*

Texas.—The mean temperature for the State was 1.6° above the normal. There was a general excess throughout the State except over the Panhandle and the mountainous portions of west Texas, where it ranged from the normal to 2.3° below. The greatest deficiency was at El Paso. The excess ranged from 0.2° to 3.5° over east and central Texas and the coast district, and from 1.2° to 3.9° over north and southwest Texas. The highest was 112°, at Waxahachie on the 26th, and the lowest, 48°, at Mount Blanco on the 18th. The average precipitation for the State was 1.00 below the normal. There was a general deficiency throughout the State, except in the vicinity of Brenham and over north Texas, the Panhandle, the northern portion of central Texas, and the western portion of west Texas, where there was an excess ranging from 0.01 to 4.75, with the greatest in the vicinity of Gainesville. The deficiency ranged from 0.25 to 3.11 over east Texas, the southern portion of central Texas, and the eastern portion of west Texas, and from 0.54 to 5.21 over southwest Texas and the coast district, with the greatest deficit in the vicinity of Brazoria. Drought prevailed during the greater portion of the month. The rainfall was very poorly distributed over the State, there being comparatively no precipitation in many places, while there were good local showers at several places in north Texas. The greatest monthly amount, 7.32, occurred at Gainesville, while none fell at some stations.—*I. M. Cline.*

Utah.—The mean temperature was 68.7°; the highest was 110°, at St. George on the 11th, and at Mount Pleasant on the 12th, and the lowest, 23°, at Soldier Summit on the 18th. The average precipitation was 0.55; the greatest monthly amount, 1.70, occurred at Pahreah, and the least, 0.02, at Soldier Summit.—*J. H. Smith.*

Virginia.—The mean temperature was 76.4°, or 0.1° above normal; the highest was 100°, at Bon Air on the 3d, and at Woodstock on the 7th, and the lowest, 46°, at Big Stone Gap on the 14th. The average precipitation was 4.46, or 0.85 above normal; the greatest monthly amount, 7.70, occurred at Stanardsville, and the least, 1.70, at Bedford City.—*E. A. Evans.*

Washington.—The mean temperature was 62.4°, or 2.2° below normal; the highest was 107°, at Kennewick on the 11th, and the lowest, 32°, Cascade Tunnel on the 25th. The average precipitation was 1.39, or 0.72 above normal; the greatest monthly amount, 4.00, occurred at Snohomish, and the least, trace, at Fort Simcoe.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 74.2°, or 3.0° above normal; the highest was 102°, at Point Pleasant on the 4th, and the lowest, 46°, at White Sulphur Springs on the 14th. The average precipitation was 5.43, or more than 1.00 above normal; the greatest monthly amount, 9.92, occurred at Beverly, and the least, 2.85, at Martinsburg.—*H. L. Ball.*

Wisconsin.—The mean temperature was 72.5°, or 2.0° below normal; the highest was 102°, at Prairie du Chien on the 8th, and the lowest, 41°, at Medford on the 13th. The average precipitation was 3.83, or 0.74 above normal; the greatest monthly amount, 15.11, occurred at Butternut, and the least, 1.20, at City Point.—*W. M. Wilson.*

Wyoming.—The mean temperature was 65.6°, or 2.0° below normal; the highest was 105°, at Lusk and Wamsutter on the 28th, and the lowest, 28°, at Atlantic City on the 3d. The average precipitation was 1.22, or 0.04 above normal; the greatest monthly amount, 3.77, occurred at Cheyenne, and the least, 0.03, at Wamsutter.—*M. F. Renoe.*

RIVER AND FLOOD SERVICE.

By PARK MORRILL, Forecast Official, in charge of River and Flood Service.

The highest and lowest water, mean stage, and monthly range at 114 river stations are given in the accompanying table. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Cairo, Memphis, and Vicks-

burg, on the Mississippi; Cincinnati, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

The following résumé of river stages and conditions of navi-